EXHIBIT B

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ORACLE AMERICA, INC., Plaintiff, vs. GOOGLE, INC., Defendant.	Case No.: 3:10-cv-03561-WHA

VIDEOTAPED DEPOSITION OF CHRIS KEMERER, Ph.D.
San Francisco, California
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Volume 1

Reported by:
RACHEL FERRIER, CSR No. 6948

Job No. CS2265292

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what degree are my results sensitive to -- looking for another word to describe sensitivity analysis -- my results are affected by whether or not those things are included. So I reran analyses without those to see what the impact would be on my conclusion.

Q All right. Did you apply the same methodologies in undertaking the PageRank analyses for purposes of assessing centrality?

MR. RAMSEY: Objection; form.

MS. ANDERSON: Let me rephrase.

Q You describe a few different scenarios in which you have used the PageRank analysis; one with respect to assessing the Android platform, one with respect to assessing Java SE, and one with respect to performing a sensitivity analysis.

Do you remember that?

A I do.

Q All right. Did you apply the same methodology of performing the PageRank analysis across each of these different scenarios?

A Yes. That was my goal.

Q All right. Tell me what that methodology was.

A All right. The methodology is really outlined in my report -- in my first report, starting on page 44 where it describes the steps required to do the PageRank

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analysis, using standard tools that are available commercially.

Q Describe to me an overview of the methodology that was performed in connection with running PageRank analysis in these different aspects that you studied.

MR. RAMSEY: Objection; form.

THE WITNESS: So at a high-level, PageRank is a tool to analyze network, so first you have to be able to represent the thing you are interested in as a network, and so, in this case, we are looking at software, and we want to think about the components as being, you know, interconnected nodes and network, and so we have to collect data on the software in terms of what their connections are. And then there's, again, commercially available tool to compute the PageRank values, and earlier today you had me point out the raw data values that I provided in the appendix, and those reflect the centrality of the nodes in the network, in this case these classes.

BY MS. ANDERSON:

Q With respect to the PageRank analyses performed in connection with your opinions in this case, did you, personally, conduct those analyses?

MR. RAMSEY: Objection; form.

THE WITNESS: They are my analyses, yes.

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BY MS. ANDERSON:

Q Did you, personally, conduct them?

MR. RAMSEY: Objection; form.

THE WITNESS: I conducted them with the assistance of my research team.

BY MS. ANDERSON:

Q Did the technical support team perform these analyses themselves?

MR. RAMSEY: Objection; form.

THE WITNESS: The analyses are mine. My technical support team ran the tools.

BY MS. ANDERSON:

Q Okay. What tools are you referring to?

A These are the tools listed here in the report, for example, NetworkX.

Q Any other tools used by the technical support team in conducting the PageRank analyses?

A In other places, we describe the tool Understand, which is also a commercially available tool for code analysis.

Q Any other tools used in connection with this analysis?

A The custom-written scripts, the PHP and R scripts, are also tools used to support the analysis.

Q Any other tools used to conduct the analysis?

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A We use Excel to show the results.

Q Have you given me a full list of tools used in conducting the analyses concerning PageRank in your opinions?

A Off the top of my head, yes, I believe that's correct.

Q All right. Who selected the use of NetworkX?

A I did in consultation with my technical support team.

Q Prior to this case, had you ever used NetworkX?

A I had not.

Q Prior to this case, had you ever used Understand?

A Prior to this case, I had not.

Q Prior to this case, had you ever used, PageRank?

A Prior to this case, no.

Q Did the technical support team suggest to you the use of NetworkX, Understand, or PageRank in connection with this case?

A We discussed a variety of options, but, yes, those were the options that seemed to be the best suited for this task.

Q And those were suggested to you by your technical support team; correct?

MR. RAMSEY: Objection; form.

THE WITNESS: After they completed a review of

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available tools that I asked them to do.
BY MS. ANDERSON:
Q Prior to this case, had you ever heard of NetworkX?
A I'm not certain.
Q Prior to this case, had you ever heard of understand?
A Not certain about that either.
Q Prior to this case, had you ever heard of PageRank?
A Oh, yes. Everybody knows PageRank.
Q Okay. And in what context had you heard about PageRank before?
A I think everyone understands that PageRank, developed by Google, is the underpinnings of the Google search engine.
Q What was the role of Understand in connection with your opinions in this case?
MR. RAMSEY: Objection; form.
THE WITNESS: I view it as a data collection tool.
BY MS. ANDERSON:
Q What kind of data did Understand collect?
A Collects data about -- it actually shows up in various places. We are talking about it in the context

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of PageRank, but I think it also is part of the other software analyses.
Basically it's a -- something that allows you to pull raw data and then put it in some other representation so that you can do analysis on it.
Q What was the role of Understand in connection with this case?
A Again, as a tool for pulling raw data and putting it in raw data for analysis.
Q Can you be more specific about what Understand did in connection with this case.
A Yes. You -- you -- you have software that it reads, and then it generates output, which is a different representation of that software, and a representation that is more amenable to analysis than the raw source code.
Q Can you be more specific in defining what Understand did in connection with this case?
MR. RAMSEY: Objection; form.
THE WITNESS: No.
BY MS. ANDERSON:
Q What role did NetworkX have in connection with the analysis in this case?
A NetworkX is the tool used to do the PageRank calculation.

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Q When you say that NetworkX was the tool used to do the PageRank calculation, can you be more specific in defining what NetworkX actually did in connection with your analyses?
MR. RAMSEY: Objection; form.
THE WITNESS: Yes. It generates the PageRank values that, again, I provided in the appendices.
BY MS. ANDERSON:
Q Can you be more specific about how it goes about doing that?
A It implements the PageRank algorithm.
Q And from where did you get the PageRank algorithm for purposes of use by NetworkX?
A I believe it is part of the NetworkX capability.
Q Why did you conclude it was appropriate to use PageRank for purposes of the analysis in this case?
A Well, stepping back, the -- the overarching issue is the substantiality, and centrality is, I believe, a measure of that in which -- is an answer I gave earlier.
PageRank is a metric for measuring centrality, and I also know that PageRank has been used by other researchers in looking at centrality in look -- thinking about software as a set of interconnected nodes.
So based on that literature, it seemed an appropriate tool to apply here.

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Q Did you do research to assess what kind of protocols or methodologies should be used in conjunction with PageRank to help it properly assess the question of centrality when studying a software platform?
MR. RAMSEY: Objection; form.
THE WITNESS: I did read prior research, and I believe I have provided citations to those papers that I relied on in my report.
MS. ANDERSON: Okay.
(Exhibit 1443 was marked for identification by the Court Reporter.)
MS. ANDERSON: I'm going to show you what has been marked as 1443 to your deposition. Exhibit 1443 is an article entitled "Helping Program Comprehension of Large Software Systems by Identifying Their Most Important Classes," authored by Ioana Sora.
Q Have you seen this document before?
A I saw this document for the first time yesterday afternoon.
Q In what context did you see this for the first time?
A Yesterday afternoon when I reviewed Dr. Astrachan's third report. He cites this paper in his February 29th report.
Q Okay. And did you read it in its entirety?

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A Yes, I did read this; although, admittedly, quickly, given the time constraints yesterday, but I have read this entire paper from front to back.
Q And do you have an understanding that this article, Exhibit 1443, makes recommendations about what needs to be studied when applying an analysis like PageRank to a software system?
MR. RAMSEY: Objection; form.
THE WITNESS: Well, like all academic articles, it does contain recommendations, but they are recommendations that I disagree with, and I believe that this article is, frankly, not very good.
BY MS. ANDERSON:
Q Okay. Which, if any, recommendations in Exhibit 1443 do you disagree with?
A I disagree with. Well, let me back up.
First off, I would characterize this paper as someone doing research using static analysis, a PageRank measure to look at software and, in particular, to identify what the author describes as most important classes, so up until that point, this author is doing exactly what I did, and the fact that Dr. Astrachan has included this in his report, in my mind, supports the notion that, in general, he is in agreement with my use of the PageRank approach in analyzing the centrality in

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helping to identify most important classes within a piece of object-oriented software.
So that's the part that I can do a full stop where I agree with it, but, however, I do have sources of disagreement.
MS. ANDERSON: All right. So move to strike. The answer is nonresponsive.
Q My question to you --
MR. RAMSEY: Oracle disagrees and -- with that objection and the motion.
BY MS. ANDERSON:
Q My question to you, sir, is: What portions of Exhibit 1443, if any, do you disagree with?
A All right. Let me try again.
This author, in the main, does something quite similar to what I do, with one -- one distinction, and the distinction is what I disagree with.
Q What is the distinction that you say you disagree with?
A All right. What this author does is they engage in the PageRank analysis, which, as part of PageRank analysis, it identifies these connections and then weights them as part of the standard PageRank analysis by your -- your connections to a particular class are -- you are counted in terms of how many connections there

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are, and then they are weighted by the things that are connected to you, how many things are connected to them, so it's a recursive type of algorithm, so that's standard PageRank analysis.
What this author does is then they go one more step and they add a set of subjective weights to the standard PageRank analysis, and that's the part that I disagree with.
Q Where in the article does the article describe this aspect that you disagree with?
A All right. If you turn to page 3, it is primarily in the paragraph that starts with: The strength of a dependency.
Do you see that?
Q Okay.
A So penultimate paragraph on page 3.
Q Is this the paragraph with which you have disagreement?
A This is where they identify this notion of weighting -- I mean, they're -- I'm not going to limit my disagreements to this one paragraph, particularly given that I've only read this paper once, yesterday afternoon, but this certainly, I think, is a critical paragraph in this paper, based on my limited reading of it yesterday.

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Q Why? Why is that?
A Why is that. Because what they do -- or what the -- the single author does is -- having PageRank, and then they basically, arbitrarily, create these weights, which they describe in this paragraph, but these weights have no particular basis, and what I mean by that is -- I mean, you know, this sort of software measurement -- this is the kind of work that I've been doing for 30 years. You know, this kind of paper, in my professional opinion and as someone who writes in this area and has been a referee and editor in this area, is not very good, because these weights are essentially subjective and ad hoc, and the author makes no attempt to do any validation of these measures in a -- in a normal, what I would consider appropriate kind of analysis where these weights would have come from -- would have been some notion that they would be tested against some other variable of interest.
So a very typical thing in software measurement research; for example, someone wants to propose a new measure and they say, for example, "Here's my measure of complexity," they will then do a test showing some correlation between that measure and some variable of interest, say quality, you know, defects, that kind of thing.

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This author does nothing. They -- like that. They just -- these numbers come out of -- you know, sort of thin air. There's no validation of these numbers at all. So that's a significant concern.

Frankly, again, I, again, got a copy of this off the web last night. I'm not sure if this paper has even been peer-reviewed.

Q When you say the numbers have no validation, which numbers are you referring to?

A Where it's described in the paragraph. It says: We assign weight 1, level 2. Weights will sum up level 3, and other weights have weights 4, all the -- that's -- that's the entirety of their description. I'm trying to infer what has gone on here, and, again, there is nothing that tells me these have any context or any reliability.

Q Beyond that criticism, is there anything else that, as you sit here today, you are aware of with which you disagree in this article, Exhibit 1443?

A Well, again, subject to the caveat that I've read this once, yesterday afternoon, and I may -- if I -- when I have an opportunity to read it more carefully have other concerns, it basically fails the most elemental test, in my view.

If you think about what they say they have

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accomplished is that they have done this better job of PageRank by taking standard PageRank analysis that's widely used and they have added these weights to it and that's meant to be better.

But when all is said and done, they go off and they do their analysis using their own idiosyncratic model. They run it on, let's see, one, two -- half a dozen pieces of software, and then they report their results. All right? And their -- what they use as their basis for deciding if their model is any good or not is -- you know, does it identify the classes that they set up as the answer to this, which are classes they pulled out of the documentation for the software.

And what they don't do, which would be the -- the obvious thing to do and the only thing -- or, excuse me, not the only thing, but the thing that you would minimally have to do to support their conclusion that what they have done is some improvement is do the same analysis using standard PageRank analysis and then show that there was some improvement on some element here.

For example, they don't actually use the term "discrimination," but in this kind of research, typically what one of the ways we evaluate is we say, "All right. Here's this tool to try to identify something. Does it -- is it highly discriminatory?

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Does it tell you the things -- does it find the things you are looking for and not give you sort of false positives kind of thing, or false negatives?"

And what you would expect to see in this -- or this -- a well-done piece of research, you would expect to see them saying, "Look, as the base case, I ran PageRank as everyone understands it." All right? And I'm not going to call it the non-weighted PageRank because that's, strictly speaking, not true, because PageRank does have within it a set of weights, but if I say -- if I refer to it as the baseline PageRank, you will understand me to mean the PageRank that everybody else uses except for this author. And then I would expect them to say, "And here's our" -- or "this person's model," and -- and show and demonstrate in some way that it was an improvement.

But they do not conduct such analysis. They simply make the claim that we have done something better, when, frankly, the analysis that they would need to do to support that claim is very simple, very straightforward. Certainly was available to them because they have some tool that's computing PageRank for them, yet they failed to do such analysis, and to me, that is -- is a glaring flaw and one that means that you cannot accept their conclusions because they haven't

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done the necessary analysis that would support such conclusions.

Q Do you have an understanding -- strike that.

Can you explain to me how a particular instance variable would be weighted when it's run through Understand as was used in the analysis reflected in your opinions?

MR. RAMSEY: Objection; form.

THE WITNESS: I'm sorry, so we are no longer talking about the Romanian paper?

MS. ANDERSON: You can set aside Exhibit 1443 for now.

THE WITNESS: Sorry, can you repeat the question, because I was -- I was looking for it in the context of what we were talking about.

MS. ANDERSON: No problem.

Q Do you have enough familiarity with Understand to explain to me how a particular instance variable would be weighted?

A No.

Q As part of the analysis that was performed in connection with your centrality opinions, did your methodology adjust in any way for classes that are not used?

MR. RAMSEY: Objection; form.

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particular factor that might coexist in time actually caused the situation; right?
A That possibility always exists, yes.
Q Okay. And that is true in economic markets; right?
A Could you give me the predicate again?
Q Sure.
There may be factors at play in a particular market one might study that actually had nothing to do with the success of a particular product even though they were correlating in time?
MR. RAMSEY: Objection; form.
THE WITNESS: Strikes me as unlikely.
BY MS. ANDERSON:
Q So is it your testimony that all of the factors present in a particular market that coexist in time with the success of a particular product must all have been part of the cause of that product's success?
A Not all factors that coexist in time, but factors that have a theory behind them that would explain the causal basis, those factors, yes, I would -- you know, the correlation is quite important there.
Q Doesn't mean it caused it, though; right?
MR. RAMSEY: Objection; form.
THE WITNESS: We always have this, you know,

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backing up in social science about, you know, we don't have the physical laws that we can test, but we make decisions based on this sort of analysis all the time.
BY MS. ANDERSON:
Q Isn't it fair to say that factors can be at play in a market at the time of a product's success that actually were a drag on the success of the product?
MR. RAMSEY: Objection; form.
THE WITNESS: By "drag on the success," do you mean that some things can be successful despite the presence of negative factors?
MS. ANDERSON: Exactly.
THE WITNESS: As a general statement? Yes, it's certainly possible.
MS. ANDERSON: Right.
Q And, in fact, you know, based on your experience with statistical analyses, that there are studies done trying to extricate factors that are part of a causal relationship for success of a product and factors that either have no relationship or have a negative effect on the success of a product; right?
MR. RAMSEY: Objection; form.
THE WITNESS: As a general principle, yes.
BY MS. ANDERSON:
Q Did you conduct any such analysis in this case to

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assess whether or not the presence of stability in connection with the 37 Java APIs actually had a causal relationship with the success of the Android platform?
MR. RAMSEY: Objection; form.
THE WITNESS: I believe it was a factor for the reasons I've written in my report in terms of what I think it means in terms of the quality of the platform, the likelihood of it attracting developers, and that belief is supported by the empirical data.
BY MS. ANDERSON:
Q Did you conduct any statistical analysis of possible factors that may have contributed to the success of the Android to assess whether or not stability of APIs actually had a causal relationship with the success of Android?
MR. RAMSEY: Objection; form.
THE WITNESS: No, I did not.
BY MS. ANDERSON:
Q You discussed before, in your definition of the word "stable," the notion that a stable platform is one that doesn't change; right?
A I believe I said "lack of change," but, yes.
Q All right. Does your definition of "stability" have any relationship to the concept of backward compatibility?

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A Yes, and I understand the concept of backward compatibility.
Q What is does "backward compatibility" mean?
A "Backward compatibility," when there is a defined standard, means that a change is made that continues to allow earlier components that met the earlier standard to continue to operate. I'm sure there's a more technical, more strict definition in the literature, but that's approximately correct.
Q Does backward compatibility have a relationship to the concept of stability that you studied in your reports?
A There are some concepts in common. The -- with backward compatibility to mean that things that used to work, and if we are trying to keep them working, which is sort of the essence of the notion behind backward compatibility, is also the outcome that you would expect in a stable environment, so they have that in common.
Q Is it your opinion that developers want platforms that never change?
MR. RAMSEY: Objection; form.
THE WITNESS: That would be an extreme statement. Clearly, developers will want platforms to improve, but with the appreciation that with change comes some cost. Then I would think they would rationally want to weigh

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costs and benefits.
BY MS. ANDERSON:
Q Is it your opinion that platforms should improve in a fashion that preserves backward compatibility?
MR. RAMSEY: Objection; form.
THE WITNESS: Well, I think that there's a trade-off. I mean, we have talked about one possible benefit of backward compatibility. I think whether or not you actually see backward compatibility in a platform probably driven by two factors.
One is, what's the size of the prior standard? In other words, how important would it be to be backward compatible? And that's going to be part of the decision about whether to try to maintain backward compatibility.
And then I think the second answer would be more of a technical question, which is, how difficult is it to maintain backward compatibility while also doing the advance, the technical advance.
So you are not always going to see backward compatibility, even though it has some desirable characteristics to it. I think whether you see backward compatibility in a system is going to be a function of both these economic factors in terms of how worthwhile is it and the sort of technical factors about how difficult is it to do and also -- and then sort of the

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interface of those might be, if I make something backward compatible, does that somehow limit me in terms of how I can advance?
So I think the backward compatibility decision question is -- is not simple. I think there are a lot of things come into play.
BY MS. ANDERSON:
Q Is it fair to say that you relied on a number of articles in describing the concept of stability in your opinions in this case?
A I have cited articles in that section, yes.
Q All right. And some of the articles you cite define the notion of stability in the context of what a developer would like to see or would expect to see in -- in a set of software?
MR. RAMSEY: Objection; form.
THE WITNESS: That's possible. I would probably have to go back and actually relook at the articles to see exactly what they said.
MS. ANDERSON: All right. Let's take a look at one of them.
(Exhibit 1444 was marked for identification by the Court Reporter.)
MS. ANDERSON: Let's take a look -- I'm showing you Exhibit 1444.

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Q This is one of the articles that you cite in your rebuttal report; correct?
A Yes, I believe it is.
Q And it's entitled "Measuring Software Library Stability Through Historical Version Analysis"; right?
A That is the title of Exhibit 1444 now.
Q And as a general matter, one of the goals of the paper was to introduce a way to measure interface and implementation stability; right?
A Well, I might need a few minutes here, and what we have done up until this point today is mostly read -- or discussed my own reports. Obviously I didn't write this paper. I might need a minute to review before I can answer questions about it.
Q Sure.
A Okay.
I believe I remember something about this paper, among the multiple papers I cited, but please go ahead.
Q When did you first read this paper?
A Probably sometime in the last two months.
Q Did your technical support team provide it to you?
A Yes, I think that's a fair statement.
Q Prior to this case, had you ever analyzed stability of software?

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A Well, I've done a lot of research on software maintenance and software volatility, which is sort of, you know, the inverse of stability, like quality and defects are inverse.
So, yes, I'm familiar with the -- the -- this work in this area and then literature, and I have done research in this area.
Q How many times, prior to this case, did you perform stability analyses of the sort that you performed in this case?
A Well, again, if we are talking, you know, broadly about software volatility, you know, multiple times. There are -- there are papers on my CV.
Q Well, I'm asking you about stability analyses of the kind you performed in this case.
How many times, prior to this case, did you perform stability analyses of the sort you performed in this case?
MR. RAMSEY: Objection; form.
THE WITNESS: Well, again, I can't give you an exact answer, and, again, to me, stability is like -- it's a dimension of maintain -- maintenance of -- which I've done a lot of empirical research in that, so I don't know. Again, I can't give you an exact number, but a lot of work I've done relates to this topic.

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A That's correct.
Q Staying with this Exhibit 1444, would you please turn to the third page. First full paragraph, about one-third of the way through is a sentence that says: We consider an API to be stable if functionality is not removed from a public interface once it's been added, end quote.
Do you see that?
A Again, I don't know what page you are on.
Q Sure. It's the third page, and it looks like this.
A Okay.
Q And it's above Section 4, "Related Work."
A Mm-hmm.
Q First full paragraph there on that column --
A Okay.
Q -- the paragraph starts with the words: We do not address.
Do you see that?
A I see that.
Q About a third of the way down that paragraph is a sentence that reads, quote: We consider an API to be stable if functionality is not removed from a public interface once it has been added, end quote.
Do you see that?

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A I do.
Q Do you agree with that?
A I agree that that's their definition.
Q Do you agree that that is a definition that the industry applies to the notion of an API being stable?
A That certainly a definition that these authors of this paper have applied, and if they are -- I don't know if they are part of the industry or where they are from.
Q Do you consider this to be a commonly accepted definition of "stable"?
A I couldn't say that, no.
Q All right. What research have you done, if any, to assess what is a commonly accepted definition of "stable" when it comes to an API?
A I've really relied on my own experience, both commercial and research in this area, and did not do any additional research on definitions of "stability."
Q Going down to the next paragraph below that is another definition of "library stability" that is assumed for purposes of the paper.
Do you see that?
A I see the paragraph, yes.
Q And in that paragraph, the author writes: Library stability is the degree to which the public interface or implementation of a software library

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changes through time in such a way that it potentially requires users of this library to rework their implementations due to these changes.
Do you see that?
A I do.
Q Do you agree with that as a definition of a gauge of stability of a library?
A Yes, I agree that that is a definition of "library stability," and they put in parens "instability," but, yes, I -- I understand that to be a definition, yes.
Q And that's because at the core of this notion of stability that you have been talking about is the idea of whether or not developers have to essentially rework implementations as a result of changes; correct?
MR. RAMSEY: Objection; form.
THE WITNESS: Yes, I understand that is part of the definition.
BY MS. ANDERSON:
Q Well, as a practical matter, do you agree that that's one of the main concerns associated with whether or not a particular library is stable?
MR. RAMSEY: Objection; form.
THE WITNESS: Yes.
BY MS. ANDERSON:

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Q Because if it changes in a way that it breaks the code, that becomes a problem for the folks who develop software; correct?
A That certainly would be a problem, yes.
Q All right. Some changes to code can break the code; right?
MR. RAMSEY: Objection; form.
THE WITNESS: Some changes certainly can break the code, yes.
BY MS. ANDERSON:
Q And some changes don't; right?
A That is --
MR. RAMSEY: Objection; form.
THE WITNESS: Sorry.
That is also the case, yes.
BY MS. ANDERSON:
Q Because some changes allow the library to remain essentially backwards compatible to prior implementations; right?
A That's possible, yes.
Q Well, that's true; right?
A Well, you have to restate that part if you want me to say it's true.
Q Do you agree that there are changes that can be made to a library that, in fact, allow that library to

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be backwards compatible such that those changes do not cause a break in the code?
MR. RAMSEY: Objection; form.
THE WITNESS: That's possible, yes.
BY MS. ANDERSON:
Q Do you think that software developers want API library -- strike that.
Is it your opinion that software developers want libraries to remain completely static and never change?
MR. RAMSEY: Objection; form.
THE WITNESS: No, because there are other considerations.
BY MS. ANDERSON:
Q And those other considerations include the extent to which a library is improved with additional methods that can be added to certain packages or otherwise enhanced; right?
MR. RAMSEY: Objection; form.
THE WITNESS: Yes. As I indicated in an earlier answer, there's a cost benefit analysis that needs to be done.
BY MS. ANDERSON:
Q And if a particular library is enhanced in a way that maintains backwards compatibility, that cost that you are referring to is significantly decreased;

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correct?
A Not necessarily; because, as I said earlier, one of the consequences of maintaining backward compatibility may be arriving at a lowest-common-denominator solution that makes it -- the whole thing less valuable than it would be if you didn't do backward compatibility.
Q But it's part of the calculation; right?
A It's part of the calculation, yes.
Q And each situation needs to be assessed on its own; true?
MR. RAMSEY: Objection; form.
THE WITNESS: Well, of course you want -- it would be ideal to look at every situation independently, but that doesn't take out the possibility of looking broadly and generally and looking at trends in a population over time.
BY MS. ANDERSON:
Q But isn't it fair to say, to assess whether or not a change to a particular library helped or hurt the success of that library and the platform in which it lies, you really need to look at all the factors involved; right?
MR. RAMSEY: Objection; form.
THE WITNESS: Certainly you can always do a more

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complete analysis by looking at more factors.
BY MS. ANDERSON:
Q That's because all libraries can differ in different ways; correct?
MR. RAMSEY: Objection; form.
THE WITNESS: It's such a general statement, I suppose that's correct, but --
BY MS. ANDERSON:
Q Libraries aren't uniformly the same across the universe; fair?
A That is a fair statement. All right.
Q All right. So they have different features; true?
A That must be the case, then, yes.
Q All right. And some may be complex; right?
MR. RAMSEY: Objection; form.
THE WITNESS: Certainly, complexity is a dimension on things -- upon which things could differ.
MS. ANDERSON: Right.
Q And some may have libraries that are viewed as very helpful; right?
MR. RAMSEY: Objection; form.
THE WITNESS: That could be certainly someone's response to a library, yes.
BY MS. ANDERSON:

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Q And some may have libraries that are not viewed as -- being viewed as particularly helpful to a particular platform; right?
MR. RAMSEY: Objection; form.
THE WITNESS: That certainly could also be a possibility.
BY MS. ANDERSON:
Q Let's take a look at Figure 1, which is at page 20 of your opening report, Exhibit 1440.
A I'm sorry, could you repeat the numbers.
Q Sure. Page 20 --
A 20.
Q -- of your report is Figure 1.
A Okay. I have that.
Q Did you prepare this figure?
A Yes, I did.
Q What are you trying to indicate in Figure 1?
A In Figure 1, this is trying to reflect an understanding and then communicate the ideas that are expressed in the paragraphs that lead up to it, 61, 62, 63, and to show that in a graphical form.
Q In Figure 1 or the paragraphs that you say are part of what is expressed in Figure 1, are you attempting to offer an opinion about -- strike that.
In your Figure 1, what, if anything, did you do

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changes to documentation as opposed to the actual code that is run for the APIs?
MR. RAMSEY: Objection; form.
THE WITNESS: No.
BY MS. ANDERSON:
Q No, you don't know, or, no, they did not?
A I don't -- I don't believe that they did include the documentation changes.
Q Do you know one way or the other?
A Again, I don't believe so.
Q What sort of testing, if any, was performed on the results of the analysis done by your team to confirm whether the changes that they were counting, for purposes of analyzing stability, were real changes as opposed to changes that actually don't affect how the code runs?
MR. RAMSEY: Objection; form.
THE WITNESS: Well, when you say "how the code runs," are we talking about application developers' code?
BY MS. ANDERSON:
Q I'm talking about the code that -- well, strike that.
You are aware that your team ran certain R scripts to analyze stability when it comes to these APIs

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that you studied; right?
A Yes.
Q And my question is whether or not the technical support team you used, or yourself did, any sort of testing sort of quality assurance to make sure that that study wasn't roping in changes that aren't really changes that would affect code running, like breaking of code, which is the concern you described that relates to the subject of stability?
MR. RAMSEY: Objection; form.
THE WITNESS: No. What was done is -- is, you know, really counting all of these as a possibility of -- or, actually, not a possibility, but as a change in the method.
But one thing I would point out with all this discussion about how things are counted, at the end of the day, what I can always come back to is: At the end of the day, the results are about comparison of two sets, and what gives me confidence in this analysis is that I know that the same rules were applied to both sets and, therefore, you know, in terms of possibilities of different ways of measuring things, unless I believe that there was some reason that that would bias the results in one way or another, I'm less concerned about that.

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BY MS. ANDERSON:
Q What do you mean when you say "the same rules were applied to both sets"?
A Well, in other words, in all of my analysis, the stability analysis and the PageRank analysis, and so forth, the -- the answer, if you will, the results are -- are some relative assessment, you know, A versus B. And I'm just pointing out that, in all these cases, the measures used are going to be applied equally to A and B. And we can talk about, you know, could you have measured it this way? Could you have measured it this way? Include this, not include this? and so forth, and, obviously, there are a variety of ways of doing it, but what gives me confidence in the results is that I know that the -- in all these cases, I've applied the methods equally to both sets, and, therefore, what really matters is not the absolute values, but the relative values.
Q So is it your testimony that if there were changes to the documentation or to comments, that that is just as important as changes to code that might break code?
MR. RAMSEY: Objection; form.
THE WITNESS: I don't think that's what I said, no.

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BY MS. ANDERSON:
Q You don't agree with what I just said; right?
A Certainly not as a general fact, no.
Q Wouldn't you agree that when it comes to analyzing stability, as you have tried to do in these opinions, a change to code that would break code in this notion of compatibility that we have been talking about is a much more significant change than a change to a comment or a change in the language in the documentation; right?
MR. RAMSEY: Objection; form.
THE WITNESS: It's more likely to be the case, yes.
BY MS. ANDERSON:
Q Because one kind of change would break the code, and one kind of change would not; right?
A I can imagine a circumstance under which misleading comments would also cause someone to write bad code, so it's not completely a free ride, but I understand the distinction you are making, and, yes, I would be more concerned about the former rather than the latter.
Q Is it fair to say that, in this case, you have not offered any opinions on whether or not Android is backward compatible?